

REMARKS

The application is believed to be in condition for allowance.

The amendment is being filed as part of an RCE application.

Claims have been amended, cancelled, and added. The amended and new claims read on the elected species.

The present claim set is believed to patentably recite the present invention.

There are no formal matters outstanding.

Applicant notes that claims 11-14 were added in the last amendment but were not examined. Claims 13-14 are now cancelled. Examination of claims 11-12 is therefore solicited.

The Official Action rejected claims 1, 2, 5, 6, 8, and 9 under 35 U.S.C. §102(b) as anticipated by NISHIKAWA (JP 2001-053211).

The Official Action rejected claims 1-2 and 5-10 under U.S.C. §103(a) as obvious over NISHIKAWA (JP 2001-053211) in view of SUGIHARA (U.S. Patent 6,392,293).

The Official Action rejected claims 1, 2 and 5-10 under U.S.C. §103(a) as obvious over OKUDAIRA (JP 2002-141456).

The Official Action rejected claims 1, 2, and 5-10 under 35 U.S.C. §103(a) as being obvious over SHIMOKAWA (U.S. Patent Application 2002/0019077).

See that claim 1 has been amended to exclude the thickness upon which the previous rejection was based, i.e., the a lead material 11 of about 10 microns satisfied the claim. Claim 1 now requires the metal thin film satisfy one of the following conditional expressions: (a) $20 \leq X_m \leq 25$ and $0.5 \leq C_{am} \leq 4.5$, and (b) $15 \leq X_m \leq 20$ and $0.7 \leq C_{am} \leq 4.5$.

The other independent claims also exclude 10 microns.

Thus, a Sn-Bi alloy plating layer of 10 microns does not anticipate.

NISHIKAWA, OKUDAIRA and SHIMOKAWA do not disclose examples of Sn-Bi alloy plating with thicknesses that fall within the claimed range, or close to the claimed range.

The recited conditional expressions are non-obvious. The lower limit of thickness is 50% greater than disclosed by the applied art. There is no motivation to modify the prior art to come within the conditional expressions as found in the amended and new claims.

Applicant demonstrates in the specification how the claimed ranges produce the desired characteristics only within a narrow range of combinations of thickness and Bi concentration. Applicant claims specific combinations to

achieve unexpected crack resistant and whisker resistant properties. These results are unexpected because the prior art encompasses a very large number of possible distinct combinations of Bismuth concentration and plating thickness.

By varying both thickness and Bi content, applicant has claimed a narrow, critical range of combinations within a broader range of combinations not disclosed or suggested by the prior art. Figures 6, 7, and 8 of the specification show the criticality of the claimed combinations for achieving the desired crack and whisker resistant properties while still retaining good wettability. Relative to the prior art ranges of thickness and Bismuth content combinations, the claimed range resulted in unexpected results.

The claimed combinations of Bismuth content and plating thickness are not merely optimizations within combinations disclosed by the prior art. As noted above, the claimed combinations are subsets of combinations not disclosed in the prior art. The prior art does not disclose the combinations established by the recited ranges of Bismuth weight percentage and metal thin film micron thickness, and does not disclose the critical subset of these combinations covered by applicant's claims.

Accordingly, reconsideration and allowance of all the original claims are respectfully requested.

Applicant believes the present application is in condition for allowance and an early indication of the same is respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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